CLAIMS

What is claimed is:

5 1. A method of classifying instance data comprising the steps of:

receiving an instance to be classified, the instance to be classified comprising

at least one attribute and corresponding relevance value;

determining a best host for the instance to be classified; and

inserting the instance to be classified into a location relative to at least one

10 child of the best host within a classification structure, the classification

structure comprising at least one node, and the node comprising at least one

attribute and corresponding relevance value.

2. The method of claim 1, wherein determining the best host for the instance to

be classified comprises:

processing class concept nodes of the classification structure, comprising the

steps of:

receiving a class concept node of the classification structure;

calculating a delta cohesiveness measurement (ΔCM) value between

20 the instance to be classified and the class concept node; and

storing the largest ΔCM value and the corresponding class concept

node at each level of the classification structure;

determining the largest ΔCM value over all levels of the classification

structure; and

25 storing the class concept node corresponding to the largest ΔCM value over all

levels of the classification structure.

3.   The method of claim 2, wherein determining the best host for the instance to be classified is performed recursively.

4.   The method of claim 3, wherein inserting the instance to be classified into a location relative to at least one child of the best host within a classification structure comprises:

selecting at least one best host child node;

calculating a ΔCM value between the instance to be classified and the at least one best host child;

storing the ΔCM value associated with each at least one best host child;

storing a count of the total number of the at least one best host child;

storing a count of the total number of stored ΔCM values associated with each at least one best host child that are greater than 0.0; and

adding the instance to be classified to the classification structure as a sibling or child of the at least one best host child, based upon the ΔCM value associated with each at least one best host child, the count of the total number of the at least one best host child, and the count of the total number of stored ΔCM values associated with each at least one best host child that are greater than 0.0.

5.   The method of claim 1, further comprising the step of:

displaying the classification structure;

determining at least one distinguishing feature of the instance to be classified; and

visually contrasting the instance to be classified vice nodes within the classification structure, based upon the value of the at least one distinguishing feature.

6.   The method of claim 5, wherein the at least one distinguishing feature comprises at least one of an attribute value, a context value and a relationship value.

5   7.   The method of claim 1, wherein the method steps are carried out in real-time.

8.   A method of predicting, comprising the steps of:
receiving a pre-existing classification structure;
receiving an instance to be predicted, comprising at least one attribute to be predicted;
determining a best host for the instance to be predicted;
optionally placing the instance to be predicted into a location relative to at least one child of the best host within the pre-existing classification structure;
determining a confidence level for an occurrence of an at least one possible value for the at least one attribute to be predicted; and
returning a prediction profile, comprising at least one possible value for the at least one attribute to predict and the corresponding confidence level for the at least one possible value for the at least one attribute to be predicted.

20   9.   The method of claim 8, wherein determining the best host for the instance to be classified comprises:
processing class concept nodes of the classification structure, comprising the steps of:
receiving a class concept node of the classification structure;
25   calculating a delta cohesiveness measurement (ΔCM) value between the instance to be classified and the class concept node; and
storing the largest ΔCM value and the corresponding class concept node at each level of the classification tree;

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determining the largest ΔCM value over all levels of the classification structure; and

storing the class concept node corresponding to the largest ΔCM value over all levels of the classification structure.

10. The method of claim 8, further comprising the step of:

displaying the classification structure;

determining at least one distinguishing feature of the instance to be predicted; and visually contrasting the instance to be predicted vice nodes within the classification structure, based upon the value of the at least one distinguishing feature.

11. The method of claim 10, wherein the at least one distinguishing feature comprises at least one of an attribute value, a context value and a relationship value.

12. The method of claim 9, wherein determining the confidence level comprises applying weighted voting over each value for the at least one target attribute of the at least one child of the best host.

13. The method of claim 9, wherein determining the confidence level comprises, in the alternative, the step of:

applying weighted voting over each value for the at least one target attribute of the at least one child of the best host, if the best host is a class concept node; or,

assigning the confidence level of the best host, if the best host is an instance node.

14. The method of claim 8, wherein the method steps are carried out in real-time.

15. A method comprising the steps of :

receiving a data set comprising instances to be classified, wherein each

instance to be classified is comprised of at least two attributes and

corresponding relevance values;

building a first classification structure from the data set of instances to be

classified;

determining the prediction accuracy of the first classification structure;

establishing at least one prediction accuracy acceptability criterion for using a

classification structure to predict attribute values;

building subsequent classification structures, wherein less attributes of the

instances to be classified are used for classifying the instances into each

subsequent classification structure;

determining the prediction accuracy of each the subsequent classification

structure;

discarding unacceptable classification structures; and

retaining at least one subsequent classification structure which uses less

attributes and yields prediction accuracy results that fall within the at least one

prediction accuracy acceptability criterion.

16. The method of claim 15, wherein building of the first and subsequent

classification structures comprises:

receiving an instance to be classified, the instance to be classified comprising

at least one attribute and corresponding relevance value;

determining a best host for the instance to be classified; and

inserting the instance to be classified into a location relative to at least one

child of the best host within a classification structure, the classification

structure comprising at least one node, and the node comprising at least one attribute and corresponding relevance value.

17.   A method comprising the steps of:

receiving at least one data set comprising at least one instance to be classified;

receiving a federated group number; and

constructing a federated group number of classification structures comprising

selecting a subset of the federated group number of classification structures, wherein the subset comprises a classification overlap number; and

classifying a copy of the at least one instance to be classified within each member of the subset of the federated group number of classification structures.

18.   The method of claim 17, wherein classifying comprises:

receiving the classification overlap number of copies of an at least one instance to be classified, the at least one instance to be classified comprising at least one attribute and corresponding relevance value;

determining a best host for the at least one instance to be classified within each of the classification overlap number of classification structures; and

inserting the copy of the at least one instance to be classified into a location relative to at least one child of the best host within each of the classification overlap number of classification structures, the classification structure comprising at least one node, and the node comprising at least one attribute and corresponding relevance value.

19.   The method of claim 18, wherein selecting a subset comprises randomly selecting a subset.

20.   The method of claim 17 wherein the method steps are executed on at least one of a parallel processor and a multiprocessor.

5   21.   A method of predicting comprising the steps of:
                receiving a group of classification structures;
                receiving an instance with an at least one attribute to predict;
                querying each member of a subset of the group of classification structures to perform a prediction process on the instance; and
10   returning a coalesced prediction profile.

        22.   The method of claim 21, wherein the coalesced prediction profile comprises an Ameliorate prediction profile.

15   23.   The method of claim 21, wherein the coalesced prediction profile comprises a Winner-take-all prediction profile.

        24.   The method of claim 21, wherein the method steps are executed on at least one of a parallel processor and a multiprocessor.

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